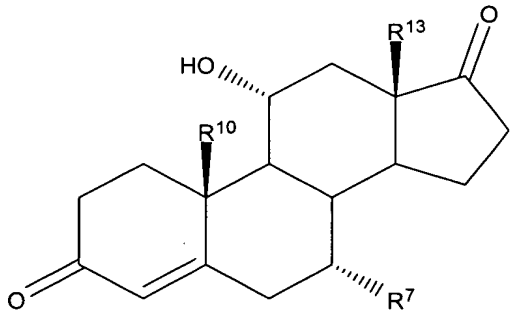
Claims:

1. Microbiological process for the production of 7α-substituted 11α-hydroxy steroids with general formula **4,B**:



4,B

in which

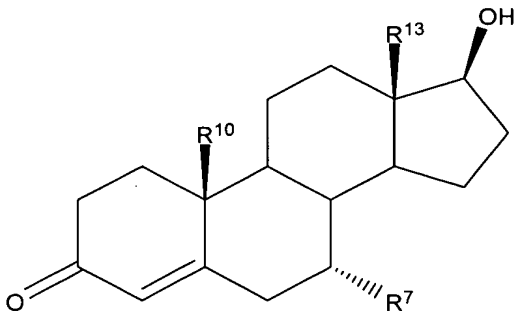
R^7 is the grouping P-Q, whereby

P represents a C_1- to C_4-alkylene, and Q represents a C_1- to C_4-alkyl- or C_1- to C_4-fluoroalkyl, and the grouping P-Q is bonded via P to the steroid skeleton,

R^{10} can be in α- or β-position and stands for H, CH_3 or CF_3, and

R^{13} is methyl or ethyl,

in which a 7α-substituted steroid with general formula **3,A**:



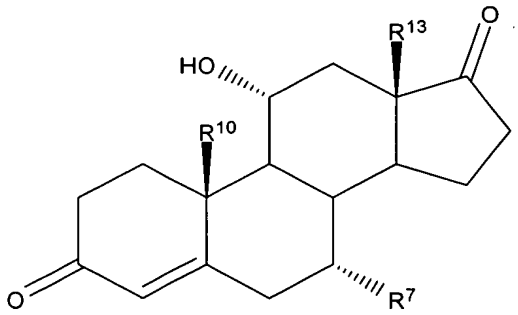
3,A

in which **R^7**, **R^{10}** and **R^{13}** have the same meanings as indicated above,

is hydroxylated and oxidized with use of a microorganism that is selected from the group that comprises *Aspergillus sp.*, *Beauveria sp.*, *Glomerella sp.*, *Gnomonia sp.*, *Haplosporella sp.* and *Rhizopus sp.*

2. Process according to claim 1, characterized in that the microorganism is selected from the group that comprises *Aspergillus awamori*, *Aspergillus fischeri*, *Aspergillus malignus*, *Aspergillus niger*, *Beauveria bassiana*, *Glomerella cingulata*, *Gnomonia cingulata*, *Haplosporella hesperedica* and *Rhizopus stolonifer.*

3. Microbiological process for the production of 7α-substituted 11α-hydroxy steroids with general formula **4,B**:



4,B

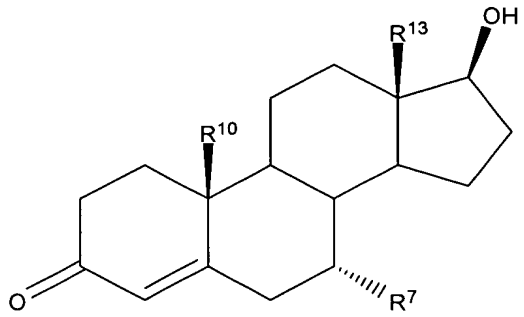
in which

R^7 is the grouping P-Q, whereby
P represents a C_1- to C_4-alkylene and Q represents a C_1- to C_4-alkyl- or C_1- to C_4-fluoroalkyl, and the grouping P-Q is bonded via P to the steroid skeleton,

R^{10} can be in α- or β-position and stands for H, CH_3 or CF_3, and

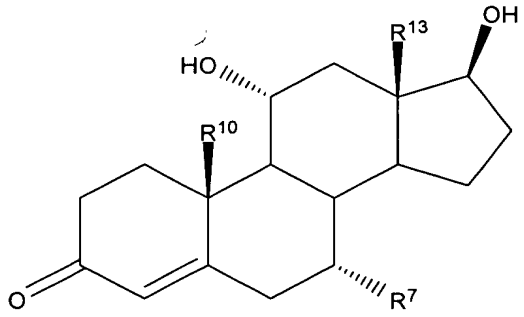
R^{13} is methyl or ethyl,

in which a 7α-substituted steroid with general formula **3,A**:



3,A

in which $\mathbf{R^7}$, $\mathbf{R^{10}}$ and $\mathbf{R^{13}}$ have the same meanings as previously indicated,
is hydroxylated in 11α-position in a first microbiological process step with use of a first microorganism that is selected from the group that comprises *Aspergillus sp.*, *Beauveria sp.*, *Gibberella sp.*, *Glomerella sp.*, *Gnomonia sp.*, *Metarrhizium sp.*, *Nigrospora sp.*, *Rhizopus sp.* and *Verticillium sp.*, with the formation of a 7α-substituted 11α-hydroxy steroid with general formula **C**:



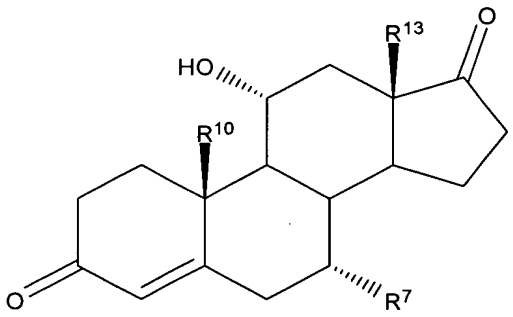
C

in which $\mathbf{R^7}$, $\mathbf{R^{10}}$ and $\mathbf{R^{13}}$ have the same meanings as indicated above, and
the 7α-substituted 11α-hydroxy steroid with general formula **C** that is produced is then oxidized in a second microbiological process step with use of a second microorganism that is selected from the group that comprises *Bacillus sp.*, *Mycobacterium sp.*, *Nocardia sp.* and *Pseudomonas sp.*, with the formation of the 7α-substituted steroid with general formula **4,B**.

4. Process according to claim 3, wherein the first microorganism is selected from the group that comprises *Aspergillus malignus*, *Aspergillus melleus*, *Aspergillus niger*, *Aspergillus ochraceus*, *Beauveria bassiana*, *Gibberella fujikuroi*, *Gibberella zeae*, *Glomerella cingulata*, *Glomerella fusaroides*, *Gnomonia cingulata*, *Metarrhizium anisopliae*, *Nigrospora sphaerica*, *Rhizopus oryzae*, *Rhizopus stolonifer* and *Verticillium dahliae*.

5. Process according to one of claims 3 and 4, wherein the second microorganism is selected from the group that comprises *Bacillus lactimorbus*, *Bacillus sphaericus*, *Mycobacterium neoaurum*, *Mycobacterium smegmatis*, *Nocardia corallina*, *Nocardia globerula*, *Nocardia minima*, *Nocardia restrictus*, *Nocardia rubropertincta*, *Nocardia salmonicolor* and *Pseudomonas testosteroni*.

6. Microbiological process for the production of 7α-substituted 11α-hydroxy steroids with general formula **4,B**:



4,B

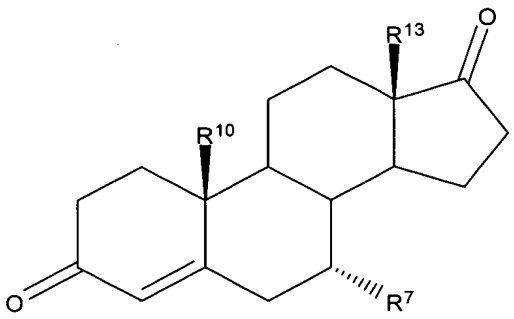
in which

R^7 is the grouping P-Q, whereby
P represents a C_1- to C_4-alkylene and Q represents a C_1- to C_4-alkyl- or C_1- to C_4-fluoroalkyl, and the grouping P-Q is bonded via P to the steroid skeleton,

R^{10} stands for H, CH_3 or CF_3, and

R^{13} is methyl or ethyl,

in which 7α-substituted steroids with general formula **D**:



D

in which $\mathbf{R^7}$, $\mathbf{R^{10}}$ and $\mathbf{R^{13}}$ have the same meanings as indicated above,
are hydroxylated with use of a microorganism that is selected from the group that comprises *Aspergillus sp.*, *Beauveria sp.*, *Curvularia sp.*, *Gibberella sp.*, *Glomerella sp.*, *Gnomonia sp.*, *Haplosporella sp.*, *Helicostylum sp.*, *Nigrospora sp.*, *Rhizopus sp.* and *Syncephalastrum sp.*

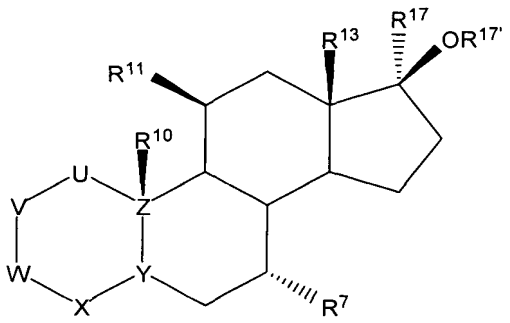
7. Process according to claim 6, wherein the microorganism is selected from the group that comprises *Aspergillus alliaceus*, *Aspergillus awamori*, *Aspergillus fischeri*, *Aspergillus malignus*, *Aspergillus melleus*, *Aspergillus nidualans*, *Aspergillus niger*, *Aspergillus ochraceus*, *Aspergillus variecolor*, *Beauveria bassiana*, *Curvularia lunata*, *Gibberella zeae*, *Glomerella cingulata*, *Glomerella fusaroides*, *Gnomonia cingulata*, *Haplosporella hesperedica*, *Helicostylum piriformae*, *Nigrospora sphaerica*, *Rhizopus oryzae* and *Syncephalastrum racemosum*.

8. Microbiological process according to one of claims 1 to 7, wherein $\mathbf{R^7}$ stands for CH_3.

9. Microbiological process according to one of claims 1 to 8, wherein $\mathbf{R^{10}}$ stands for H.

10. Microbiological process according to one of claims 1 to 9, wherein $\mathbf{R^{13}}$ stands for CH_3.

11. 7α,17α-Substituted 11β-halogen steroids with general formulas **8, 10,** and **12**:



8,10,12

in which

U-V-W-X-Y-Z stands for one of ring structures C^1-C^2-C^3-C^4=C^5-C^{10}, C^1-C^2-C^3-C^4-C^5=C^{10} or C^1-C^2-C^3-C^4-C^5-C^{10}, whereby in this case, an oxo group (=O) is bonded to W (=C^3), or for ring structure C^1=C^2-C^3=C^4-C^5=C^6, whereby in this case radical O**R**^{3} is bonded to W (=C^3),

R^3 stands for H, C_1- to C_4-alkyl, C_1- to C_4-alkanoyl or a cyclic C_3- to C_7-ether with the O-atom of the O**R**^{3}-radical,

R^7 is the grouping P-Q, whereby

P represents a C_1- to C_4-alkylene and Q represents a C_1- to C_4-alkyl- or C_1- to C_4-fluoroalkyl, and grouping P-Q is bonded via P to the steroid skeleton,

R^{10} can be in α- or β-position and stands for H, CH_3 or CF_3, and is present only if X-Y-Z is not C^4-C^5=C^{10},

R^{11} is a halogen,

R^{13} is methyl or ethyl,

R^{17} stands for H, C_1- to C_{18}-alkyl, alicyclic C_1- to C_{18}-alkyl, C_1- to C_{18}-alkenyl, alicyclic C_1- to C_{18}-alkenyl, C_1- to C_{18}-alkinyl, C_1- to C_{18}-alkylaryl, C_1- to C_8-alkylenenitrile or for the grouping P-Q, whereby the grouping P-Q has the above-mentioned meaning,

R$^{17'}$ stands for H, C_1- to C_{18}-alkyl, alicyclic C_1- to C_{18}-alkyl, C_1- to C_{18}-alkenyl,

alicyclic C_1- to C_{18}-alkenyl, C_1- to C_{18}-alkinyl or C_1- to C_{18}-alkylaryl, whereby $\mathbf{R^{17'}}$ also can be bonded via a keto group to the 17β-oxy group, and whereby $\mathbf{R^{17'}}$ also in addition can be substituted with one or more groups $N\mathbf{R^{18}R^{19}}$ or one or more groups $SO_x\mathbf{R^{20}}$, whereby x = 0, 1 or 2 and $\mathbf{R^{18}}$, $\mathbf{R^{19}}$ and $\mathbf{R^{20}}$ in each case independently of one another can have the same meaning as $\mathbf{R^{17}}$,

as well as their pharmaceutically compatible addition salts, esters and amides.

12. 7α,17α-Substituted 11β-halogen steroids according to claim 11, wherein U-V-W-X-Y-Z stands for ring structure C^1-C^2-C^3-C^4=C^5-C^{10} or C^1-C^2-C^3-C^4-C^5=C^{10} or C^1=C^2-C^3=C^4-C^5=C^{10}.

13. 7α,17α-Substituted 11β-halogen steroids according to one of claims 11 and 12, wherein $\mathbf{R^1}$ stands for H.

14. 7α,17α-Substituted 11β-halogen steroids according to one of claims 11 to 13, wherein $\mathbf{R^7}$ stands for CH_3.

15. 7α,17α-Substituted 11β-halogen steroids according to one of claims 11 to 14, wherein $\mathbf{R^{11}}$ stands for fluorine.

16. 7α,17α-Substituted 11β-halogen steroids according to one of claims 11 to 15, wherein $\mathbf{R^{13}}$ stands for CH_3.

17. 7α,17α-Substituted 11β-halogen steroids according to one of claims 11 to 16, wherein $\mathbf{R^{17}}$ stands for H, CH_3, C_1- to C_{18}-alkinyl, CH_2CN or CF_3.

18. 7α,17α-Substituted 11β-halogen steroids according to one of claims 11 to 17, wherein $\mathbf{R^{17}}$ is ethinyl.

19. 7α,17α-Substituted 11β-halogen steroids according to one of claims 11 to 18, wherein $\mathbf{R^{17'}}$ stands for H.

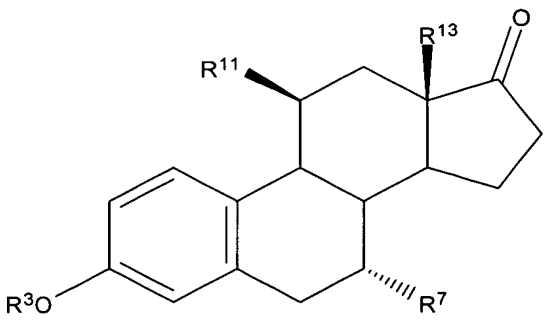
20. 7α,17α-Substituted 11β-halogen steroids according to one of claims 11 to 19, namely

17α-Ethinyl-11β-fluoro-17β-hydroxy-7α-methylestr-4-en-3-one

17α-Ethinyl-11β-fluoro-17β-hydroxy-7α-methylestr-5(10)-en-3-one

17α-Ethinyl-11β-fluoro-7α-methylestra-1,3,5(10)-triene-3,17β-diol.

21. 7α-Substituted 11β-haloestra-1,3,5(10)-trienes with general formula **6**:



6

in which

R^3 stands for H, C_1- to C_4-alkyl, C_1- to C_4-alkanoyl or a cyclic C_3- to C_7-ether with the O-atom of the O**R^3**-radical,

R^7 is the grouping P-Q, whereby

P represents a C_1- to C_4-alkylene and Q represents a C_1- to C_4-alkyl- or C_1- to C_4-fluoroalkyl, and the grouping P-Q is bonded via P to the steroid skeleton,

R^{11} is a halogen;

R^{13} is methyl or ethyl,

as well as their pharmaceutically compatible addition salts, esters and amides.

22. 7α-Substituted 11β-haloestra-1,3,5(10)-trienes according to claim 21, namely

11β-Fluoro-3-hydroxy-7α-methylestra-1,3,5(10)-trien-17-one.

23. Process for the production of 7α,17α-substituted 11β-halogen steroids with general formula **10** according to one of claims 11 to 20, in which U-V-W-X-Y-Z stands for the ring structure C^1-C^2-C^3-C^4=C^5-C^{10}, with the following process steps:

- Nucleophilic substitution in a 7α-substituted 11α-hydroxy steroid with general formula **4,B** in 11-position with a halodehydroxylating reagent;

- Reaction of the 7α-substituted 11β-halogen steroid that is produced in this case with an alkylating agent in a selective manner on the C^{17} atom of the ring skeleton to form the 7α,17α-substituted 11β-halogen steroid with general formula **10**.

24. Process for the production of 7α,17α-substituted 11β-halogen steroids with general formula **12** according to one of claims 11 to 20, in which U-V-W-X-Y-Z stands for the ring structure C^1-C^2-C^3-C^4-C^5=C^{10}, with the following process steps:

- Nucleophilic substitution in a 7α-substituted 11α-hydroxy steroid with general formula **4,B** in 11-position with a halodehydroxylating reagent,
- Reaction of the 7α-substituted 11β-halogen steroid that is produced in this case with an alkylating agent in a selective manner on the C^{17} atom of the ring skeleton to form the 7α,17α-substituted 11β-halogen steroid with general formula **10**,
- Isomerization of the 7α,17α-substituted 11β-halogen steroid with general formula **10** to form the corresponding isomer with general formula **12**, in which U-V-W-X-Y-Z stands for the ring structure C^1-C^2-C^3-C^4-C^5 =C^{10}.

25. Process for the production of 7α,17α-substituted 11β-halogen steroids with general formula **8** according to one of claims 11 to 20, in which U-V-W-X-Y-Z stands for the ring structure C^1=C^2-C^3 =C^4-C^5=C^6 with the following process steps:

- Nucleophilic substitution in a 7α-substituted 11α-hydroxy steroid with general formula **4,B** in 11-position with a halodehydroxylating reagent,
- Oxidizing of the 7α-substituted 11β-halogen steroid that is produced in this case to form 7α-substituted estra-1,3,5(10)-triene with general formula **6** according to one of claims 17 and 18;
- Reaction of the 7α-substituted estra-1,3,5(10)-triene with general formula **6** with an alkylating agent in a selective manner on the C^{17} atom of the ring skeleton to form the 7α,17α-substituted 11β-halogen steroid with general formula **8**.

26. Use of the 7α,17α-substituted 11β-halogen steroids with general formulas **8, 10,** and **12** according to one of claims 11 to 20 for the production of pharmaceutical agents.

27. Pharmaceutical preparations that contain at least one 7α,17α-substituted 11β-halogen steroid with general formulas **8, 10,** and **12** according to one of claims 11 to 20 as well as at least one pharmaceutically compatible vehicle.